Classification

Biological Sciences: Evolution

Title

The evolution of social monogamy in primates is not consistently associated with male infanticide

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Comparative analyses suggest that monogamous breeding systems evolved in mammals where feeding competition reduces range overlap between breeding females, preventing males from guarding more than one female at at time [1]. In contrast, a recent analysis for primates suggests that monogamy evolved as a form of paternal care that reduces the risk of male infanticide [2]. Here we re-examine the distribution of monogamy in primates and attempt to explain the contrasting results of the two analyses. Methods and detailed results are described in Supplementary Material.

Our analyses of data for primates provide no evidence that the evolution of monogamy in primates follows a different pattern from the evolution of monogamy in other mammals. Our results suggest that:

- evolutionary transitions to social monogamy in primates are associated with reductions in home range overlap, indicating that they are associated with increased competition between females.
- the ancestral condition for transitions to monogamy is associated with decreased risks of infanticide compared to ancestors which remained polygynous rather than increased risks. Phylogenetic reconstructions suggest that monogamy is likely to have evolved from ancestors in which males did not commit infanticide.

We repeated our analyses classifying the social system of species on the basis of Opie et al.'s criteria and relying on their method and phylogeny, indicating that the contrast between the results of the two analyses is unlikely to result from these differences. One possible explanation for the contrasting results of Opie et al. is that their analyses underestimated the frequency of male infanticide by classifying many polygynous species as not showing male infanticide on the basis of insufficient evidence. Opie et al. addressed the dilemma of deciding when the absence of

observations of infanticide is sufficient to conclude that it does not occur by only including species for which at least 20 scientific studies have been published. However, for several of the species included the majority of publications are medical reports on captive animals where experimental conditions limit any possibility of male infanticide. Even when animals are studied in natural populations rare events like male infanticide may not be observed for several years [3]. The inclusion of a large sample of polygynous species classified as not having infanticide could have biased the Bayesian inference and led to the conclusion that transitions to and from infanticide are relatively uncommon in polygynous species and this may, in turn, have caused the model to infer that changes in infanticide are associated with monogamy. The Bayesian inference may have been further biased by Opie et al's choice of the Brownian motion model to reflect evolutionary transitions in infanticide. Changes in binary traits are not expected to occur consistently over evolutionary time, but only once conditions pass a threshold [4]. Our results indicate that models of evolution that do not assume constant change explain transitions in infanticide better, and these reconstructions provide no support for the suggestion that the distribution of male infanticide exerted an important influence on the evolution of monogamy either in primates or in other mammals.

References:

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Supplementary Material and Data available at http://doi.org/10.5061/dryad.hc967.